

AFCEE REMEDIATION MATRIX - HIERARCHY OF PREFERRED ALTERNATIVES

	POL-Vadose Zone (i.e., jet fuel, diesel)	POL-Excavated Soil	Floating Product Deep (>20ft)	Floating Product Shallow (<20ft) Low Permeability	Floating Product Shallow (<20ft) High Permeability	Dissolved Fuel in Ground Water (BTEX)	Chlorinated Solvents in Vadose Zone (i.e., TCE)	Dissolved Chlorinated Solvents in Ground Water	Heavy Metals in Vadose Zone	Heavy Metals in Excavated Soil	POL Vapor Treatment	Chlorinated Solvent Vapor Treatment
Natural Attenuation/Assimilation	1	1	1	1	1	1	1	1	1	1		
Bioventing	2	4					3 co-metabolism					
Soil Vapor Extraction	3	5					2					
Heat Enhanced Vapor Extraction	4						4					
Low Permeability Cover/Cap	5						6		3			
Excavate and/or Haul	6	8					7		4			
Composting (no tilling)		2										
Land Farming		3								2		
Low Temp Thermal Desorp		6										
Incineration (High Temp)		7										
Apparent vs Actual Studies			2	2	2							
Passive Extraction Wells			4	5	4							
Hand Bail if Appropriate			3	3	3							
Vacuum Assist Pumping			5	4	5							
Dual Pump System			6									
Air Sparging*						3		3				
Passive Treatment Wall						4		4				
Conventional Pump and Treat						5		5				
Slurry Wall						6		6				
Stabilization							5		2	3	1	1
Permitted Direct Emission											2	
Flare												
Biological Filter												4 co-metabolism
Catalytic Incineration											6	2
On-site Regenerated Polymer											4	3
Carbon Adsorption											5	
Internal Combustion Engine											7	
GW Recirculation/Stripping						2		2			3	5

THIS MATRIX IS AN ATTEMPT TO RANK TECHNOLOGIES/PROCESSES THAT SHOULD BE CONSIDERED FOR USE AT COMMON AIR FORCE SITES. MANAGERS SHOULD USE THIS HIERARCHY FOR SCREENING TECHNOLOGIES/PROCESSES AND SHOULD BE ABLE TO JUSTIFY WHY A PARTICULAR TECHNOLOGY/PROCESS WAS SELECTED OVER OTHERS WITH LOWER NUMBERS. FOR INSTANCE, IF SOIL VAPOR EXTRACTION (3) IS THE SELECTED TECHNOLOGY/PROCESS FOR POL IN THE VADOSE ZONE, THEN MANAGERS SHOULD BE ABLE TO JUSTIFY WHY NEITHER NATURAL ATTENUATION (1) NOR BIOVENTING (2) WAS SELECTED. THE NATURAL ATTENUATION/ASSIMILATION SHOULD ALWAYS BE CONSIDERED FIRST AND, IF SELECTED, SHOULD BE BASED ON A SCIENTIFICALLY DEFENSIBLE RISK ASSESSMENT. SELECTION OF THIS TECHNOLOGY/PROCESS SHOULD BE ACCOMPANIED BY FIELD SAMPLING AND MODELLING TO QUANTIFY AND PREDICT NATURAL ATTENUATION RATES. A LONG-TERM MONITORING PROGRAM SHOULD BE IMPLEMENTED TO VERIFY NATURAL ATTENUATION MODEL PREDICTIONS.

* VERY SUSCEPTIBLE TO SUBSURFACE HETEROGENEITIES. APPLICABLE WHERE THE INSTALLATION OF A HIGH DENSITY OF SPARGING (EXTRACTION) POINTS IS ECONOMICALLY FAVORABLE.

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